TANDY®

TRS-80® Model 4D Quick Reference Guide

Tandy® TRS-80® Model 4D
Quick Reference Guide:
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Startup

Be sure all floppy disk drives are empty and all equipment is off.

1. Turn on all peripheral equipment (such as a printer), except the hard disk.
2. Hard disk users: Turn on the primary hard disk drive.
3. Turn on the computer.
4. Insert a system diskette into Drive Ø and close the drive door. TRSDOS displays its startup message.
5. TRSDOS prompts you for the date. Enter it in the *mm/dd/yy* format.
6. The following system prompt appears on your screen:

   TRSDOS Ready

   Now, you can type in a TRSDOS command.
7. To start BASIC, type:

   BASIC (ENTER)

   and you see the BASIC prompt:

   Ready

   Now, you can type in a BASIC command.

This quick reference guide is divided into 2 sections: TRSDOS and BASIC.

TRSDOS
Commands and Utilities

In the commands below, the keyword is bold. Information that:

- Is in upper-case must be typed exactly as is.
- Is in lower-case italics is variable. You supply the value(s).
- Is enclosed in brackets is optional.

Asterisks (*) in the margin denote advanced commands.

APPEND *source* [TO] *destination* [(ECHO,STRIP)]

Adds one disk file onto the end of another.

ATTRIB *filespec* [(USER=*"password"*, OWNER=*"password"*, PROT=*level*, VIS ¦ INV)]

Changes the protection of a file. The *level* can be EXEC, READ, UPDATE, WRITE, RENAME, REMOVE, or FULL.

```
ATTRIB CUSTFILE/DAT:1 (USER="",
OWNER="BOSSMAN",PROT=READ,VIS)
```

ATTRIB [:*drive*] [(LOCK ¦ UNLOCK,MPW=*"password"*, NAME =[*"disk name"*], PW=[*"password"*])]

Changes the protection of files on a drive.

```
ATTRIB :1 (NAME="DATA",
PW="SECRET", MPW="BOSSMAN")
```

AUTO [[:*drive*] ¦ ?[:*drive*] ¦ =[:*drive*]] [*] [*command line*]

Stores a *command line* for automatic execution each time TRSDOS starts up. AUTO by itself deletes the current AUTO command line.

```
AUTO BASIC    AUTO *DO INIT/JCL:1
```

BACKUP [*partspec* ¦ *-partspec*]:*source drive* [TO] :*destination drive*. [(MPW=*"password"*,SYS,INV,MOD, QUERY=YES,OLD,NEW,X,DATE=*"date range"*)]

Duplicates a system or data diskette. *partspec* can be a partial name.

```
BACKUP :0 :1
BACKUP (MOD, QUERY, MPW="SECRET")
```

BOOT [(CLEAR), (ENTER), (D)]

Resets the system. After pressing (ENTER) to reset the system, you can hold down any combination of the keys listed above.

```
BOOT
```

BUILD *filespec* [(HEX,APPEND)]

Creates an input file for JCL, KSM, and other TRSDOS commands.

```
BUILD MYPROGA/FIX:0
BUILD DISPLAY/BLD (HEX)
```

CAT [*partspec* ¦ *-partspec*] [:] [*drive 1*] [-] [:] [*drive 2*] [(ALL,INV,MOD,NON,PRT,SYS,DATE = "*date range*", SORT = NO)]

CAT works the same as DIR except the ALL parameter is OFF.

```
CAT :1-
```

* SET *devspec* [TO] **CLICK/FLT** [(CHAR = *number*)] FILTER *KI *devspec*

Establishes the key-click filter.

CLS

Clears the screen and homes the cursor.

```
CLS
```

* SET *CL [TO] **COM/DVR**

Prepares the communications line (*CL) for use.

* **COMM** *devspec*[(XLATES = X'*aabb*', XLATER = X'*aabb*', XON = X'*cc*',XOFF = X'*cc*', NULL = OFF)]

Lets 2 computers communicate via a device.

CONV [*partspec* ¦ *-partspec*]:*source drive* [:*destination drive*] [(VIS,INV,SYS,NEW ¦ OLD,QUERY = NO,DIR)]

Converts files from a TRSDOS 1.3 (Model III) diskette into a TRSDOS Version 6 formatted diskette. *filespec* can be a partial name.

```
CONV :1 :0 (VIS,Q=NO)
```

COPY *source* [TO] *destination* [(LRL = *number* CLONE = NO,ECHO,X)]

Copies data from one file or device to another.

```
COPY TEST/DAT TO :1
COPY *KI TO *PR (ECHO)
COPY ASM/LST TO *PR
```

CREATE *filespec* [(REC = *number*,[LRL = *number*])] ¦ [(SIZE = *number*)]

Creates a file and reserves space on the disk for future use.

```
CREATE -INVENT/DAT (SIZE=20)
```

DATE [*mm/dd/yy*]

Sets the date or displays the current date.

```
DATE 08/09/82    DATE
```

* **DEBUG** [([ON ¦ OFF] [,] [EXT])]

Sets up the debug monitor for testing and debugging machine-language programs.

```
DEBUG    DEBUG (OFF)    DEBUG (EXT)
```

DEVICE [(D=NO,B=YES,S=NO,P=YES)]

Displays the current status of each drive and the options in use.

```
DEVICE    DEVICE (B=YES)
```

DIR [*partspec* ¦ *-partspec*] [:] [*drive 1*] [-] [:] [*drive 2*] [(ALL=OFF,INV,MOD,NON,PRT,SYS, DATE="*date range*",SORT=NO)]

Lists the directory of a drive or file. *partspec* can be a partial name.

```
DIR :1    DIR (DATE="10/01/81-")
```

DO [$,=,*] *filespec* [(*label*,PARM=*value*)] [;]

Compiles and executes a DO file.

```
DO DRIVE/JCL    DO = DRIVE/JCL
```

* **DUMP** *filespec* (START=*address*,END=*address*, [TRA=*address*] ¦ [ASCII[,EXT=*value*]])

Copies an area of memory to a disk file.

```
DUMP ROUTINE/CMD
(START=X'7000',END=X'8000',
TRA=X'7000')
```

* **FILTER** *devspec* [USING] *phantom devspec*

Filters data to or from a device, using a filter program.

```
FILTER *PR USING *DU
```

* SYSTEM DRIVE=*drive*, [DISABLE ¦ ENABLE,] DRIVER="**FLOPPY**")

Lets you define a logical drive as a floppy drive.

FORMAT [:*drive* [(ABS,NAME="*disk name*", MPW="*password*",SDEN ¦ DDEN,CYL=*number*, QUERY=NO,STEP=*number*,DIR=*number*, SIDES=*number*)]]

Formats a blank or old disk for use.

```
FORMAT
FORMAT :1 (NAME="DATA3",
MPW="SECRET")
```

FORMS [(DEFAULT,ADDLF,CHARS=*number*,FFHARD, INDENT=*number*,LINES=*number*,MARGIN=*number*, PAGE=*number*,QUERY,TAB,XLATE=X'*aabb*')]

Sets up printer options.

```
FORMS (MARGIN=10,CHARS=80,
INDENT=6)
```

SET *FF [TO] **FORMS/FLT**
FILTER *PR *FF

Prepares the printer filter (*FF) for use.

FREE [:*drive*] [(PRT)]

Lists free space and the number of files on each disk; if *drive* is specified, displays space map of that disk.

```
FREE    FREE :0 (PRT)
```

HELP [*filespec* [*] [*keyword*] [(P,V,R,S)]]

Displays information about TRSDOS keywords.

```
HELP DOS
HELP * ATTRIB
```

* ROUTE ***JL** [TO] *filespec*
ROUTE ***JL** [TO] *devspec*

Establishes the Joblog device (*JL), which sends certain information to a file or device.

```
ROUTE *JL TO LISTER/JBL
ROUTE *JL TO *PR
```

SET *devspec* [TO] **KSM/FLT** [USING] *filespec* [(ENTER=value)]
FILTER *KI *devspec

```
SET *DU KSM/FLT USING ROUTINE/KSM
FILTER *KI *DU
```

LIB

Displays library commands

```
LIB
```

* **LINK** *devspec1* [TO] *devspec2*

Links 2 logical devices.

```
LINK *DO *PR
```

LIST *filespec* [(ASCII8,NUM,HEX,TAB=*number*,PRT, LINE=*number*,REC=*number*,LRL=*number*)]

Lists contents of a file to the display or printer.

```
LIST TESTFILE:0
LIST MONITOR/CMD (PRT)
```

* **LOAD** [(X)] *filespec*

Loads a program file into memory.

```
LOAD STATUS/CMD
LOAD (X) PROGRAM/CIM
```

LOG *:drive*

Logs in a minimum or full system disk, or a double-sided disk in Drive 0.

```
LOG :1
```

SYSTEM (DRIVE = *drive*, DRIVER = "**MEMDISK**")

Adds to the system a pseudo floppy drive which keeps its files in memory.

```
SYSTEM (DRIVE=2,DRIVER="MEMDISK")
```

* **MEMORY** [(CLEAR = *value*, HIGH = *address*, LOW = *address*, ADD = *address*, WORD = *word*, BYTE = *byte*, GO = *address*)]

Reserves a portion of memory, sets or displays current HIGH$ and LOW$, modifies a memory address, or jumps to a specified memory location.

```
MEMORY
```

* **PATCH** *filespec* (*hex address* = *value* ¦ D*record*,*byte* = *value*; F*record*,*byte* = *value* ¦ L*code*)

Changes the contents of a disk file.

```
PATCH MONITOR/CMD (X'E100'=C3 66
00)
PATCH X/CMD (D01,23=FD:F01,23=00)
```

* **PATCH** *filespec1* USING *filespec2* [(YANK,REMOVE)]

Makes changes contained in *filespec2* to *filespec1*.

```
PATCH BACKUP/CMD:0 USING
SPECIAL/FIX
```

PURGE [partspec ¦ -partspec]*:drive* [(QUERY = NO, MPW = "*password*", INV, SYS, DATE = "*date range*")]

Deletes files. *partspec* can be a partial name.

```
PURGE :0 (MPW="SECRET")
PURGE /BAS:1 (Q=N)
```

REMOVE *filespec* [filespec . . .]

Deletes files from the directory.

```
REMOVE ALPHA/DAT:0 BREAKER/DAT:0
```

REMOVE *devspec* [*devspec* . . .]

Removes devices from the device table.

```
REMOVE *LU
```

RENAME *filespec1* [TO] *filespec2*
RENAME *devspec1* [TO] *devspec2*

Changes the name of a file or device.

```
RENAME TEXT/DAT:0 TO OLD/DAT
RENAME *UD TO *TX
```

REPAIR *:drive*

Updates system information on disks that were formatted under Model I TRSDOS.

```
REPAIR :1
```

* **RESET** *devspec*
RESET *filespec*

Returns a device to its original startup condition. Closes an open file.

```
RESET *PR    RESET PRINTER/DAT
```

* **ROUTE** *devspec1* [TO] *devspec2*
ROUTE *devspec* [TO] *filespec* [(REWIND)]
ROUTE *devspec* (NIL)

Routes a device to another device, to a disk file, or to nothing (NIL).

```
ROUTE *PR *DO
ROUTE *PR TO PRINTER/DAT
```

[**RUN**[(X)]]*filespec* [(*command text*)]

Loads and executes a program. *command text* are optional values the program may require.

```
RUN CONTROL/CMD    CONTROL/CMD
```

* **SET** *devspec* [TO] *driver filespec* [(*parameters*)]

Assigns a driver program to a device. *parameters* are optional values the driver program may require.

```
SET *SP TO SERIAL/DRV
```

* **SET** *phantom devspec* [TO] *filter filespec* [USING] [(*parameters*)]

Assigns a filter program to a phantom device. *parameters* are optional values the filter program may require.

```
SET *LC TO TRAP/FLT
```

* **SETCOM** [(DEFAULT,BAUD=*number*,WORD=*number*, STOP=*number*,PARITY=ON ¦ OFF ¦ "EVEN" ¦ "ODD",QUERY,BREAK=*value*)]

Sets up RS-232-C communications or display status.

```
SETCOM (BAUD=300,WORD=8,STOP=1,
PARITY=OFF)
```

SETKI [(DEFAULT,RATE=*number*,WAIT=*number*, QUERY)]

Sets the keyboard repeat values. SETKI by itself displays the current values.

```
SETKI (DELAY=15)
```

* **SPOOL** [*devspec*] [TO] [*filespec*] (NO,MEM=*number*, BANK=*number*,DISK=*number*,PAUSE, ! RESUME, CLEAR)

Establishes an output buffer for a device.

```
SPOOL *PR TO TEXTFILE:0
(MEM=5,DISK=15)        SPOOL *PR (NO)
```

* **SYSGEN** [([YES ! NO] [,] [DRIVE=*drive*])]

Stores the current system options in a file (CONFIG/SYS) on *drive*. If the switch is NO, the configuration file is removed.

```
SYSGEN (YES,DRIVE=4)    SYSGEN (NO)
```

* **SYSTEM** (*subcommand* [*parameters*])

Selects certain options of your TRSDOS system. In the following SYSTEM commands, *switch* is YES or NO.

SYSTEM (ALIVE[=*switch*])
Displays a moving character when the task processor is running.

SYSTEM (BLINK=*switch*)
SYSTEM (BLINK=*number*)
SYSTEM (BLINK,[LARGE ! SMALL])
Controls the cursor character.

SYSTEM (BREAK[=*switch*])
Enables or disables the (BREAK) key.

SYSTEM (BSTEP=*number*)
Establishes the default bootstrap step rate used by FORMAT.

SYSTEM (DATE[=*switch*)
Turns on or off the startup date prompt.

SYSTEM ([DRIVE=*drive*][,ENABLE ! DISABLE, DRIVER="*device driver*",][CYL=*number*, DELAY=*switch*, STEP=*number*, WP=*switch*])
Sets parameters for *drive*.

SYSTEM (FAST)
Sets the system to run at 4 MHz, Model 4D speed.

SYSTEM (GRAPHIC [=*switch*])
Informs the system that the printer has the capability of reproducing TRS-80 graphics during the screen-print.

SYSTEM HERTZ*number*
Patches your system to work at 50 Hertz (*number*=5) or 60 Hertz (*number*=6).

SYSTEM (RESTORE [=*switch*])
Enables/disables the restoring of all drives to Track 0 at startup.

SYSTEM (SLOW)
Sets the system to run at 2 MHz, Model III speed.

SYSTEM (SMOOTH [=*switch*])
Gives priority to disk access over keyboard and RS-232 accesses.

SYSTEM (SYSRES=*number*)
Adds TRSDOS system overlays into high memory.

SYSTEM (SYSTEM=*drive*)
Assigns *drive* as the system drive.

SYSTEM (TIME[=*switch*])
Turns on or off the startup time prompt.

SYSTEM (TRACE[=*switch*])
Displays the contents of the program counter.

SYSTEM (TYPE[=*switch*])
Turns on or off the KI/DVR type-ahead feature.

TAPE100 [*file1*] [TO] [*file2*] [(READ ! WRITE)]
Reads a Model 100 cassette tape file and writes it to a disk file, or reads a disk file and writes it to cassette tape.

```
TAPE100 PRNTER TO PRINT/DAT:0
(READ)
```

TIME [*hh:mm:ss*] [(CLOCK[=YES ! NO])]
Sets the time or displays the current time.

```
TIME     TIME 12:29:34
```

TOF
Sends a top-of-form code to printer.

```
TOF
```

VERIFY [(ON ! OFF)]
Sets the VERIFY function on or off.

```
VERIFY (ON)     VERIFY (OFF)
```

TRSDOS Error Messages

Number	Message	Explanation/Action
7 X'07'	Attempted to read locked/ deleted data record	Check for error in program
6 X'06'	Attempted to read system data record	Check for error in program
5 X'05'	Data record not found during read	Try again; use another disk; reformat old disk
13 X'0D'	Data record not found during write	Try again; use another disk
39 X'27'	Device in use	Reset device in use before REMOVEing it
8 X'08'	Device not available	Check device specification; be sure peripheral is ready
30 X'1E'	Directory full— can't extend file	Copy files to new disk
17 X'11'	Directory read error	Try another drive or disk, or clean the drive
18 X'12'	Directory write error	Try another disk
27 X'1B'	Disk space full	Write file to a disk with more available space
28 X'1C'	End of file encountered	Check for error in program
63	Extended error	Error code is in HL register
25 X'19'	File access denied	Use correct password; use no password for unprotected file
41 X'29'	File already open	Use RESET to close the file
24 X'18'	File not in directory	Check spelling of filespec
38 X'26'	File not open	Open file before access
20 X'14'	GAT read error	Try another drive, or clean the drive
21 X'15'	GAT write error	Try another drive or disk, or clean the drive

Number	Message	Explanation/Action
22 X'16'	HIT read error	Try another drive
23 X'17'	HIT write error	Try another drive or disk, or clean the drive
37 X'25'	Illegal access attempted to protected file	OWNER password is required for the requested access
32 X'20'	Illegal drive number	Drive is not in system or not ready for access
19 X'13'	Illegal file name	Use proper filespec syntax
16 X'10'	Illegal logical file number	Check for error in program
34 X'22'	Load file format error	Attempt was made to load a non-program file
3 X'03'	Lost data during read	Try another drive or disk
11 X'0B'	Lost data during write	Try another drive or disk
42 X'2A'	LRL open fault	COPY file to another file that has the specified LRL
33 X'21'	No device space available	REMOVE non-system devices to provide more space
26 X'1A'	No directory space available	Use a different disk or REMOVE unwanted files
0 X'00'	No error	Check for error in program
1 X'01'	Parity error during header read	Try another drive or disk, or clean the drive
9 X'09'	Parity error during header write	Try another drive or disk, or clean the drive
4 X'04'	Parity error during read	Try another drive or disk, or clean the drive
12 X'0C'	Parity error during write	Try another drive or disk, or clean the drive
31 X'1F'	Program not found	Check spelling of filespec; check for proper disk in drive
40 X'28'	Protected system device	System devices cannot be REMOVEd

Number	Message	Explanation/Action
29 X'1D'	Record number out of range	Provide correct record number or try another copy of the file
2 X'Ø2'	Seek error during read	Set step rate with SYSTEM command or try another drive or disk, or clean the drive
1Ø X'ØA'	Seek error during write	Set step rate with SYSTEM command or try another drive or disk
—	Unknown error code	Check for error in program
14 X'ØE'	Write fault on disk drive	Try another disk or drive
15 X'ØF'	Write protected disk	Remove write-protect tab or write enable disk using SYSTEM command
43 X'2B'	SVC parameter error	Check program to see if correct parameter is passed
44 X'2C'	Parameter error	Check for spelling or value or abbreviation of the parameter
63 X'3F'	Extended error	Check for error in program

BASIC
Statements and Functions

In the statements and functions below, the keyword is bold. Information that:

- Is in upper-case must be typed exactly as is.
- Is in lower-case italics is variable. You supply the value(s).
- Is enclosed in brackets is optional.

Functions are marked by asterisks (*) in the margin. Statements are unmarked.

Terms:

integer: a whole number from −32768 to 32767

string: a sequence of characters to be taken verbatim

dummy number or dummy string: a number or string used in an expression to meet syntactic requirements, but the value of which is insignificant.

* **ABS** (*number*)

Computes the absolute value of number.

```
Y = ABS(X)
```

* **ASC** (*string*)

Returns the ASCII code for the first character of string.

```
PRINT ASC("A")
```

* **ATN** (*number*)

Computes the arctangent of number; returns the value in radians.

```
Y = ATN(X/3)
```

AUTO [*line*] [,*increment*]

Automatically generates line numbers every time you press (ENTER). AUTO begins numbering at *line* and advances to the next line, using *increment*.

```
AUTO    AUTO 1000, 100    AUTO , 5
```

CALL *address* [(*parameter list*)]

Transfers program control to an assembly-language subroutine stored at *address*. The *parameter list* contains the values to be passed to the external subroutine.

* **CDBL** (*number*)

Converts *number* to double precision.

```
Y# = CDBL (N*3)
```

CHAIN [MERGE] "*filespec*"[,*line*] [,ALL] [,DELETE *line* - *line*]

Loads a BASIC program named *filespec*, chains it to a "main" program, and begins running it. The *line* is the first line to be run in the CHAINed program. ALL passes every variable in the main program to the CHAINed program. MERGE "overlays" the lines of *filespec* with the main program. DELETE erases lines in the overlay so that you can MERGE in a new overlay.

* **CHR$** (*code*)

Returns the corresponding character of the ASCII or graphic character *code*.

```
PRINT CHR$(35)
```

* **CINT** (*number*)

Converts *number* to integer representation.

```
PRINT CINT(17.65)
```

CLEAR [,*memory location*] [,*stack space*]

Clears the value of all variables and closes all open files. Optionally, it also sets the highest *memory location* for BASIC and the amount of *stack space.*

```
CLEAR   CLEAR ,75   CLEAR ,61000,200
```

CLOSE [*buffer,...*]

Closes access to a file or files. The *buffer* number (the same used to OPEN the file) can be in the range 1 to 15.

```
CLOSE 1, 2, 8
CLOSE FIRST% + COUNT%
```

CLS

Clears the screen.

```
CLS
```

COMMON *variable,...*

Passes 1 or more variables to a CHAINed program.

```
100 COMMON A, B, C, D(), G$
110 CHAIN "PROG3",10
```

CONT

Resumes execution of a program that has been stopped by the (BREAK) key or by a STOP or an END statement in the program.

```
CONT
```

* **COS** (*number*)

Computes the cosine of *number. number* must be in radians.

```
Y = COS(X * .01745329)
```

* **CSNG** (*number*)

Converts number to single precision.

```
S = CSNG(.1453885509)
```

* **CVD** (*8-byte string*)

Restores the string value to a numeric value.

```
A# = CVD(GROSSPAY$)
```

* **CVI** (*2-byte string*)

Restores the string value to a numeric value.

* **CVS** (*4-byte string*)

Restores the string value to a numeric value.

DATA *constant,...*

Stores numeric and string constants to be accessed by a READ statement.

```
1340 DATA NEW YORK, CHICAGO, LOS
     ANGELES, PHILADELPHIA,
     DETROIT
1350 DATA 2.72, 3.14159,
     0.0174533, 57.29578
```

DATE$

Return today's date.

```
PRINT DATE$
```

DEFDBL/INT/SNG/STR

```
DEFDBL letter,...
DEFINT letter,...
DEFSNG letter,...
DEFSTR letter,...
```

Defines any variables beginning with the letter(s) as: (DBL) double precision, (INT) integer, (SNG) single precision, or (STR) string.

```
DEFDBL L-P      DEFINT I-N, W, Z
DEFSNG I,Q-T    DEFSTR A
```

DEF FN *function name* [(*argument,...*)] = *function definition*

Defines *function name* according to *function definition.* The *argument* represents those variables in the *function definition* that are to be replaced when the function is called.

```
DEF FNR=RND(90)+9
```

DEF USR [*digit*] = *address*

Defines the starting address for *digit* assembly-language subroutines.

```
DEF USR3 = &H7D00
DEF USR = (BASE + 16)
```

DELETE *line1 - line 2*

Deletes from *line1* to *line2* of a program in memory.

```
DELETE 70    DELETE 50-110
```

DIM *array (dimension(s)), array (dimension(s)),...*

Sets aside storage for the *arrays* with the *dimensions* you specify.

```
DIM AR(100)    DIM L1%(8,25)
```

EDIT *line*

Enters the edit mode so that you can edit *line.*

```
EDIT 100    EDIT
```

END

Ends execution of a program.

```
END
```

* **EOF**(*buffer*)

Detects the end of a file.

```
IF EOF(1) THEN 1540
```

ERASE *array,...*

Erases 1 or more arrays from a program.

```
ERASE C,F
```

* **ERL**

Returns the number of the line in which the most recent error has occurred.

```
PRINT ERL    E = ERL
```

* **ERR**

Returns the error code (if an error has occurred).

```
IF ERR = 7 THEN 1000 ELSE 2000
```

* **ERRS$**

Returns a system error number and message.

```
PRINT "THE LATEST TRSDOS ERROR
IS";ERRS$
```

ERROR *code*

Simulates the error associated with *code* during program execution.

```
ERROR 1
```

* **EXP** (*number*)

Calculates the natural exponential of *number.*

```
PRINT EXP(-2)
```

FIELD *buffer, length* AS *field name,...*

Divides a direct-access *buffer* into 1 or more fields. Each field is identified by the *field name* and is the *length* you specify.

```
FIELD 3, 128 AS A$, 128 AS B$
```

* **FIX** (*number*)

Returns the truncated integer of *number.*

```
PRINT FIX(2.6)
```

FOR *variable* = *initial value* TO *final value* [STEP *increment*]
NEXT [*variable*]

Establishes a program loop

```
20 FOR H=1 TO -10 STEP -2
30 PRINT H
40 NEXT H
```

* **FRE**(*dummy number*) or (*dummy string*)

Returns the amount of free memory space.

```
PRINT FRE(44)
PRINT FRE("44")
```

GET *buffer* [,*record*]

Gets a *record* from a direct disk file and places it in a *buffer.*

```
GET 1    GET 1, 25
```

GOSUB *line*

Goes to a subroutine, beginning at the specified *line.*

```
GOSUB 1000
```

GOTO *line*

Goes to the specified *line.*

```
GOTO 100
```

* **HEX$** (*number*)

Calculates the hexadecimal value of *number.*

```
PRINT HEX$(30), HEX$(50),
HEX$(90)
```

IF *expression* **THEN** *statement(s)* or *line* [**ELSE** *statement(s)* or *line*]

Tests a conditional expression and makes a decision regarding program flow.

```
10 IF X > 127 THEN PRINT "OUT OF
   RANGE" : END
20 IF A < B THEN PRINT "A < B"
   ELSE IF A = B THEN PRINT "A =
   B" ELSE PRINT "A > B"
```

* **INKEY$**

Returns a keyboard character. If no character is available, a null string is returned.

```
A$ = INKEY$
```

* **INP**(*port*)

Returns the byte read from a *port*. *port* may be any integer in the range 0 to 255.

```
A=INP(42)
```

INPUT [*prompt string*;] *variable1, variable2,...*

Inputs data to a program during execution.

```
INPUT Y%
```

INPUT *#buffer, variable,...*

Inputs data from a sequential disk file into 1 or more variables.

```
INPUT #1, A, B INPUT #4, A$, B$, C$
```

INPUT$ (*number*[,*buffer*])

Inputs a string of *number* characters from either the keyboard or a sequential disk file. The *number* must be a value in the range 1 to 255.

```
A$ = INPUT$(5)    A$ = INPUT$(11,3)
```

* **INSTR**([*integer*,]*string1, string2*)

Searches for the first occurrence of *string 2* in *string 1* and returns the position at which the match is found.

```
INSTR(A$, "12")
```

* **INT**(*number*)

Converts *number* to an integer value.

```
PRINT INT(79.89)
```

KILL *"filespec"*

Removes *filespec* from the disk.

```
KILL "FILE/BAS"    KILL "DATA:2"
```

* **LEFT$**(*string, integer*)

Returns all characters left of position *integer* in the *string*.

```
PRINT LEFT$("BATTLESHIPS", 6)
```

* **LEN**(*string*)

Returns the number of characters in *string*.

```
X = LEN(SENTENCE$)
```

[LET]*variable = expression*

Assigns the value of *expression* to *variable.*

```
LET A$ = "A ROSE IS A ROSE"
LET B1 = 1.23
```

LINE INPUT[*prompt string*;] *string variable*

Inputs a line from the keyboard.

```
LINE INPUT A$
```

LINE INPUT *#buffer, variable*

Reads a line of data from a sequential-access file into a string *variable.* The *buffer* is the number used when the file was OPENed.

```
LINE INPUT #1, A$
```

LIST [*startline*] [-] [*endline*]

Lists program lines to the display.

```
LIST 50    LIST 50-85    LIST -227
```

LLIST [*startline*] [-] [*endline*]

Lists program lines to the printer.

```
LLIST 780    LLIST 50-    LLIST .-
```

LOAD *"filespec"* [,R]

Loads *filespec,* a BASIC program, into memory. If R is used, the program is RUN automatically.

```
LOAD "PROG1/BAS:2"
LOAD "PROG1/BAS"
```

* **LOC** (*buffer*)

Returns the current record number.

```
IF LOC(1)>55 THEN END
```

* **LOF** (*buffer*)

Returns the end-of-file record number.

```
Y = LOF(5)
```

* **LOG**(*number*)

Computes the natural logarithm of *number.*

```
PRINT LOG(3.14159)
Z = 10*LOG(PS/P1)
```

* **LPOS** (*number*)

Returns the position of the line printer's print head within the line printer's buffer.

```
IF LPOS(X)>60THEN PRINT CHR$(13)
```

LPRINT *data,...*

Prints *data* at the printer.

```
LPRINT (A * 2)/3
```

LPRINT TAB(*number*)

Moves the print head to the column specified by *number*. *number* is in the range 1 to 255.

```
LPRINT "NAME";TAB(75);"AMOUNT"
```

LPRINT USING *format; data,...*

Prints *data* at printer, using a specified *format*.

```
LPRINT USING "####.#"; 2.17
```

LSET *field name* = *data*

Sets *data* in a direct-access buffer *field name*. The data is left-justified.

```
LSET NM$ = "JIM CRICKET, JR."
```

MEM

Returns the amount of free memory.

```
PRINT MEM
```

MERGE *"filespec"*

Loads *filespec*, a BASIC program, and merges it with the program currently in memory.

```
MERGE "PROG2/TXT"
```

MID$ (*old string, position* [,*length*]) = *replacement string*

Replaces a portion of *old string* with *replacement string*.

```
PRINT MID$(A$, 3, 4) = "12345":
PRINT A$
```

* **MID$** (*string, integer* [,*number*])

Returns a substring of the *string*, beginning with the *integer* character. *number* is the number of characters to include in the substring.

```
PRINT MID$(A$, 3, 2)
```

* **MKD$**(*double-precision expression*)

Converts a *double-precision expression* to a string value and returns the 4-byte string.

* **MKI$**(*integer expression*)

Converts an *integer expression* to a string value and returns the 8-byte string.

* **MKS$**(*single-precision expression*)

Converts *single-precision expression* to a string value and returns the 2-byte string.

NAME *old filespec* AS *new filespec*

Renames *old filespec* as *new filespec*.

```
NAME "FILE" AS "FILE/OLD"
```

NEW

Erases a program from memory and clears all variables.

```
NEW
```

* **OCT$**(*number*)

Computes the octal value of number

```
PRINT OCT$(30), OCT$(50),
OCT$(90)
```

ON ERROR GOTO *line*

Goes to a subroutine, beginning at the line specified. Specifying 0 as the *line* returns control to the system error handler.

```
ON ERROR GOTO 1500
```

ON *expression* **GOSUB** *line,...*

Goes to a subroutine, beginning at the *line* specified by the value of *expression.*

```
ON L-1 GOSUB 1000, 2000, 3000
```

ON *expression* **GOTO** *line,...*

Goes to the *line* specified by the value of *expression.*

```
ON X GOTO 190, 200, 210
```

OPEN *mode, buffer, "filespec"* [*,record length*]

Opens a disk file in the specified mode (O for sequential output, I for sequential input, D or R for direct input/output, and E for sequential extend).

```
OPEN "O", 1, "CLIENTS/TXT"
OPEN "D", 5, "TESTED/BAS", 64
```

OPTION BASE *n*

Sets *n* as the minimum value for an array subscript.

```
OPTION BASE 1
```

OUT *port, data byte*

Sends *data byte* to a machine output *port. port* can be any integer in the range 0 to 255.

```
OUT 32,100
```

* **PEEK**(*memory location*)

Returns a byte from *memory location.*

```
A = PEEK(&H5A00)
```

POKE *memory location, data byte*

Writes a *data byte* into *memory location.*

```
POKE 15360, 191
```

* **POS** (*dummy number*)

Returns the position of the cursor.

```
PRINT TAB(40) POS(0)
```

PRINT *data,...*

Prints numeric or string *data* on the display.

```
PRINT X,Y PRINT "*"
```

PRINT TAB(*number*)

Moves the cursor to the column specified by *number. number* can be in the range 1 to 80.

```
PRINT TAB
PRINT "NAME";TAB(40);"AMOUNT"
```

PRINT USING *format; data item,...*

Prints *data items* using the specified *format.*

```
PRINT USING "!";A$;
```

PRINT @ *location,*
PRINT @ (*row, column*),

Specifies where print is to begin. *location* is in the range 0 to 1919. *row* is in the range 0 to 23, and *column* is in the range 0 to 79.

```
PRINT @ 0, "*"
```

PRINT *#buffer, item1, item 2,...*

Prints a data item or items in a sequential disk file.

```
PRINT#1, A,B
```

PUT *buffer* [,*record*]

Puts a *record* in a direct-access file. *buffer* is the number used to OPEN the file.

```
PUT 1    PUT 1, 25
```

RANDOM

Reseeds the random number generator.

```
RANDOM
```

READ *variable,...*

Reads values from a DATA statement and assigns them to a *variable* or *variables.*

```
READ T    READ S$, T, U
```

REM

Inserts a remark line into a program and instructs the computer to ignore the rest of the program line.

```
10 :REM INPUT SINGLE-PRECISION
20 INPUT A
```

RENUM [*new line*] [,[line] [,*increment*]]

Renumbers a program, starting at the specified *line* and numbering it as *new line*. The optional *increment* sets the increment to be used between each line number

```
RENUM    RENUM 6000, 5000, 100
```

RESTORE [*line*]

Restores a program's access to previously read DATA statements.

```
RESTORE
```

RESUME [*line*]
RESUME NEXT

Resumes program execution after an error-handling routine has been performed. RESUME *line* causes BASIC to branch to the specified line. RESUME NEXT causes it to branch to the statement following the point at which the error occurred.

```
RESUME     RESUME 10     RESUME NEXT
```

RETURN

Returns control to the line immediately following the most recently executed GOSUB.

```
RETURN
```

* **RIGHT$**(*string, number*)

Returns the last *number* characters of the *string*.

```
PRINT RIGHT$("WATERMELON", 5)
```

* **RND**(*number*)

Generates a pseudorandom number between 0 and the number. The *number* must be greater than 0 and less than 32768.

```
A = RND(2)    A = RND(45)
PRINT RND(0)
```

* **ROW** (*dummy number*)

Returns the row position of the cursor.

```
X = ROW(Y)
```

RSET *field name* = *data*

Places *data* in a direct-access buffer *field name*.

```
RESET NM$ = "JIM CRICKET, JR."
```

RUN [*line*]
RUN *filespec* [,R]

RUN or RUN *line* runs the program that is in memory. RUN *filespec* loads a program from disk; then runs it.

```
RUN "PROGRAM/A"  RUN "EDITDATA", R
```

SAVE *"filespec"* [,A] [,P]

Saves a program in a disk under *filespec.* A causes the file to be stored in ASCII format. P causes the file to be stored in an encoded binary format.

```
SAVE "FILE1/BAS.JOHNQDOE:3"
SAVE "MATHPAK/TXT", A
```

* **SGN** (*number*)

Determines *number's* sign. If *number* is positive, SGN returns 1. If it is negative, SGN returns −1. If it is 0, SGN returns 0.

```
Y = SGN(A * B)
```

* **SIN**(*number*)

Computes the sine of *number;* the *number* must be in radians.

```
PRINT SIN(7.96)
```

SOUND *tone, duration*

Generates a sound with the specified *tone* (0-7) and *duration* (0-31).

```
SOUND 1,2
```

* **SPACE$**(*number*)

Returns a string of *number* spaces. The *number* must be in the range 0 to 255.

```
PRINT "DESCRIPTION" SPACE$(4)
```

* **SPC**(*number*)

Prints a line of *number* blanks. The *number* must be in the range 0 to 255.

```
PRINT "HELLO" SPC(15) "THERE"
```

* **SQR** (*number*)

Calculates the square root of *number.*

```
PRINT SQR(155.7)
```

STOP

Stops program execution.

```
STOP
```

* **STR$**(*number*)

Converts *number* into a string. If the *number* is positive, STR$ places a blank before the string.

STRING$(*number, character*)

Returns a string of the specified *number* of characters. The *number* must be in the range 0 to 255. The *character* is a string or an ASCII code.

```
B$ = STRING$(25, "X")
PRINT STRING(50, 10)
```

SWAP *variable1, variable2*

Exchanges the values of 2 variables.

```
SWAP F1#, F2#
```

SYSTEM [*"command"*]

Returns to TRSDOS. If you specify a *command*, TRSDOS executes it and returns you to BASIC.

```
SYSTEM    SYSTEM "DIR"
```

* **TAB**(*number*)

Spaces to position *number* on the display or printer. The *number* must be in the range 0 to 255. This function can be used only in PRINT and LPRINT statements.

```
PRINT A$ TAB(25) B$
```

* **TAN**(*number*)

Computes the tangent of *number*. The *number* must be in radians. If it is in degrees, use TAN (*number* * .11745329). The result is always single precision.

```
PRINT TAN(7.96)
```

* **TIME$**

Returns the time (in 24-hour format).

```
A$ = TIME$
```

TROFF

Turns off the trace function.

```
TROFF
```

TRON

Turns on the trace function (to follow program flow).

```
TRON
```

USR[*digit*] (*expression*)

Calls the user's assembly-language subroutine identified by *digit* and passes the result of *expression.*

```
X = USR5(Y)
```

* **VAL**(*string*)

Calculates the numeric value of *string*. VAL terminates its evaluation on the first character that has no meaning in a numeric term.

```
PRINT VAL("100 DOLLARS")
```

* **VARPTR** (*variable*)
VARPTR (*#buffer*)

Returns the absolute memory address. When used with a *variable*, VARPTR returns the address of the first byte of data identified with *variable.* When used with a *buffer,* it returns the address of the file's data buffer.

```
Y = USR1(VARPTR(X))
```

WAIT *port, integer1* [,*integer2*]

Suspends program execution until a machine input port develops a specified bit pattern.

```
100 WAIT 32,2
```

WHILE *expression*

.

.

.

WEND

Executes a series of statements in a loop as long as a given condition is true.

```
WHILE...WEND
```

WIDTH [LPRINT,*integer*]

Sets the print line width at the display or printer. If LPRINT is omitted, the width is set for screen.

```
WIDTH 60
WIDTH LPRINT 132
```

WRITE [*data,...*]

Prints *data* on the display.

```
WRITE A,B,C$
```

WRITE *#buffer, data,...*

Writes data to a sequential file.

```
WRITE #1, A$,B$
```

Control Keys

Command Mode

(BACKSPACE) or (←) or (CTRL)(H)	Backspaces the cursor, erasing the preceding character in the line.
(SPACEBAR)	Enters a blank space character and advances the cursor one space.
(BREAK)	Interrupts line entry and starts over with a new line.
(CTRL)(J)	Line feed—Starts a new physical line without ending the current logical line.
(CAPS) or (SHIFT)(0)	Switches to either all upper-case or upper- and lower-case.
(ENTER)	Ends and enters the current logical line.

Execution Mode

(SHIFT)(@)	Pauses execution. Press any other key (except (BREAK)) to continue.
(BREAK)	Terminates execution and returns to command mode.
(ENTER)	Interprets data entered from the keyboard with the INPUT statement.

Operators

Each operator or group of operators is precedent over the group below it.

( )	Parentheses
^	Exponentiation
+ −	Unary negative, positive
* /	Multiplication, division
\	Integer division
MOD	Modulus
+ −	Addition, subtraction
< > = <= >= <>	Relational tests
NOT	
AND	
OR	
XOR	
EQV	
IMP	

Edit Commands

(A)	Moves the cursor to the beginning of the line and cancels editing changes.
n(BACKSPACE)	Moves the cursor *n* spaces to the left. If no *n* is given, moves the cursor 1 space to the left.
n(C)	Lets you change *n* characters, beginning at the current cursor position.
n(D)	Deletes *n* characters to the right of the cursor.
(E)	Ends editing and saves all changes.
(ENTER)	Records all changes and exits edit mode.
(SHIFT) (↑)	Escapes from an insert subcommand (I, H, or X).
(H)	Deletes the rest of a line and lets you insert material at the current cursor position.
(I)	Lets you insert material at the current cursor position.
n(K)*c*	Deletes all characters up to the *n*th occurrence of character *c* and moves the cursor to that position.
(L)	Lists the line.
(Q)	Quits the edit mode and cancels all changes.
n(S)*c*	Searches for the *n*th occurrence of character *c* and moves the cursor to that position.
n(SPACEBAR)	Moves the cursor *n* spaces to the right.
(X)	Displays the rest of the line and lets you add material at the end.

Special Characters

'	(apostrophe) Abbreviation for :REM.
,	(comma) PRINT punctuation; spaces over to the next 16-column PRINT zone.
;	(semicolon) PRINT punctuation; separates items in a PRINT list but does not add spaces when they are output.
:	(colon) Separates statements on the same line.
.	(period) Indicates the current line; use with EDIT and LIST commands.
D	Used in double-precision exponential notation.
E	Used in single-precision exponential notation.
%	Makes the variable integer precision.
!	Makes the variable single precision.
#	Makes the variable double precision.
$	Makes the variable string type.

BASIC Error Messages

Code	Explanation
1	NEXT without FOR
2	Syntax error
3	Return without GOSUB
4	Out of data
5	Illegal function call
6	Overflow
7	Out of memory
8	Undefined line
9	Subscript out of range
10	Redimensioned array
11	Division by zero
12	Illegal direct
13	Type mismatch
14	Out of string space
15	String too long
16	String formula too complex
17	Can't continue
18	Undefined user function
19	No RESUME
20	RESUME without error
21	Unprintable error
22	Missing operand
23	Line buffer overflow
26	FOR without NEXT
29	WHILE without WEND
30	WEND without WHILE
Disk Errors	
50	Field overflow
51	Internal error
52	Bad file number
53	File not found
54	Bad file mode
55	File already open
57	Device I/O error
58	File already exists
61	Disk full
62	Input past end
63	Bad record number
64	Bad file name
66	Direct statement in file
67	Too many files
68	Disk write protected
69	File access denied
70	Command cancelled

Internal Codes

Keyword	Code	Keyword	Code
ABS	65414	INKEY$	224
AND	248	INP	65424
ASC	65429	INPUT	133
ATN	65422	INSTR	219
AUTO	171	INT	65413
CALL	182	KILL	200
CDBL	65438	LEFT$	65409
CHAIN	185	LEN	65426
CHR$	65430	LET	136
CINT	65436	LINE	177
CLEAR	146	LIST	147
CLOSE	195	LLIST	158
CLS	159	LOAD	196
COMMON	184	LOC	65454
CONT	153	LOF	65455
COS	65420	LOG	65418
CSNG	65437	LPOS	65435
CVD	65452	LPRINT	157
CVI	65450	LSET	201
CVS	65451	MEM	225
DATA	132	MERGE	197
DATE$	222	MID$	65411
DEF	151	MKD$	65458
DEFDBL	176	MKI$	65456
DEFINT	174	MKS$	65457
DEFSNG	175	MOD	253
DEFSTR	173	NAME	199
DELETE	170	NEW	148
DIM	134	NEXT	131
EDIT	167	NOT	214
ELSE	162	OCT$	65433
END	129	ON	149
EOF	65453	OPEN	191
EQV	251	OPTION	186
ERASE	166	OR	249
ERL	215	OUT	156
ERR	216	PEEK	65431
ERROR	168	POKE	152
ERRS$	223	POS	65425
EXP	65419	PRINT	145
FIELD	192	PUT	194
FIX	65439	RANDOM	187
FN	212	READ	135
FOR	130	REM	143
FRE	65423	RENUM	172
GET	193	RESTORE	140
GOSUB	141	RESUME	169
GOTO	137	RETURN	142
HEX$	65434	RIGHT$	65410
IF	139	RND	65416
IMP	252	ROW	65459

Keyword	Code	Keyword	Code
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RUN	138	USING	218
SAVE	203	USR	211
SGN	65412	VAL	65428
SIN	65417	VARPTR	221
SOUND	205	WAIT	150
SPACE$	65432	WEND	181
SPC	213	WHILE	180
SQR	65415	WRITE	183
STEP	210	XOR	250
STOP	144	+	243
STR$	65427	–	244
STRING$	217	*	245
SWAP	165	/	246
SYSTEM	189	^	247
TAB	209	\	254
TAN	65421	'	220
THEN	208	>	240
TIME$	226	=	241
TO	207	<	242
TROFF	164		

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